



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,939	09/26/2001	Songlin Zhuang	BAO TONG-101	1288
7590 11/26/2003				
Robert K. Tendler, Esq. 65 Atlantic Avenue Boston, MA 02110				
EXAMINER CHOWDHURY, TARIFUR RASHID				
ART UNIT 2871		PAPER NUMBER		

DATE MAILED: 11/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.	Applicant(s)	
09/963,939	ZHUANG ET AL.	
Examiner	Art Unit	
Tarifur R Chowdhury	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 8-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.  
37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

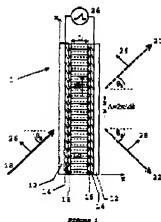
A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1, 4 and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Kralik et al., (Kralik), US 2002/0097355.**

3. Kralik discloses (page 2, paragraph 0022-0024) and shows in Fig. 1, a polarization independent optical switch, comprising:

- spaced apart transparent plates (12), the plates having conductors threat (14);



- a liquid crystal layer (10) sandwiched between the plates and having a

photopolymer dispersed therein;

- a diffraction grating (10) formed within the liquid crystal layer and having a predetermined spatial frequency (Fig. 1); and
- a voltage selectively applied across the plates to erase the grating such that an impinging light beam (18) has its exit direction (22) offset in accordance with the spatial frequency ( $m = +1$ ) of the grating so as to exit at a predetermined exit point or has its exit direction (20) unaltered by the switch such that the light beams exits at a different exit point, thus to switch the incoming beam (18) between two exit points. (Fig. 1) (page 2, paragraph 0024.

Accordingly, claim 1 is anticipated.

As to claims 4 and 5, Kralik also discloses that the impinging beam is a p-polarized optical beam (page 2, paragraph 0024) (applicant's plane polarized monochromatic light beam).

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kralik as applied to claims 1, 4 and 5 above and in view of Stole et al., (Stone), "performance of photonic switching systems based on electro-optic volume holographic diffraction gratings", SPIE 41112, 38-47 (2000).**

6. Kralik differs from the claimed invention because he does not explicitly disclose that the optical switch is comprised of two cells cascaded together wherein the exit point of the light beam is determined by which the cell that has voltage applied thereto and one of the cell has a diffraction grating having a spatial frequency different from the other cell and thus be able to vary the exit point.

Stone discloses an optical switch wherein the switch comprising at least two cells cascaded together and the cell that has voltage applied thereto determines the exit point of the beam. Stone also discloses that one of the cell has a diffraction grating of different spatial frequency than the other cell and thus vary the exit point associated with the diffraction grating of a cell to further control the exit point of the impinging beam (pages 41-44, Figs. 4 and 6). Stone also discloses these switches are advantageous because they exhibit very low insertion loss, have high speed, high power handling capability and low cost.

Stone is evidence that ordinary workers in the art would find a reason, suggestion or motivation to use form an optical switch using at least two cascaded cells.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the optical switch of Kralik by cascading at least two cells together so that the cell that has voltage applied thereto determines the exit point of the beam and one of the cell has a diffraction grating of different spatial frequency than the other cell and thus vary the exit point associated with the diffraction grating of a cell to further control the exit point of the impinging beam, so that a switch

that exhibit very low insertion loss, have high speed, high power handling capability and low cost is obtained, as per the teachings of Stone.

**7. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kralik as applied to claims 1, 4 and 5 above and in view of Tanaka et al., (Tanaka), USPAT 5,748,272.**

8. Kralik differs from the claimed invention because he does not explicitly disclose that the grating are formed by two plane polarized interacting laser beams.

Tanaka discloses an optical switch wherein the gratings are formed by two plane polarized interacting laser beams (Figs. 16A-16C, COL. 16, lines 39-43). Tanaka also discloses that using of laser beams to produce gratings is economical and simple (col. 4, lines 47-50).

Tanaka is evidence that ordinary workers in the art of liquid crystal would find a reason, suggestion or motivation to use two interactive plane polarized laser beams to form gratings.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use two interactive plane polarized laser beams to form the gratings of Kralik in an economical and simple way.

Accordingly, claims 6 and 7 would have been obvious.

***Response to Amendment***

9. The declaration filed on 10/06/03 under 37 CFR 1.131 has been considered but is ineffective to overcome the US 2002/0097355 reference since all the inventors have failed to signed the declaration.

Accordingly, US 2002/0097355 has not been withdrawn as a reference and the rejection is maintained.

***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tarifur R Chowdhury whose telephone number is (703) 308-4115. The examiner can normally be reached on M-Th (6:30-5:00) Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7005 for regular communications and (703) 308-7724 for After Final communications.

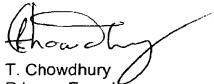
Application/Control Number: 09/963,939

Page 7

Art Unit: 2871

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

TRC  
November 20, 2003



T. Chowdhury  
Primary Examiner  
Technology Center 2800